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Factors affecting the time of surgery in emergent groin hernia cases Acil Kasık Fıtığı Olgularında cerrahi süresini Etkileyen Faktörler

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Abstract
Aim: To determine the safety principles of hernia surgery for patients who underwent emergent groin hernia surgery by evaluating risk factors, diagnostic methods, the time up to the operation and surgical techniques.
Methods: In this study, the patients operated for groin hernia repair between the years 2017 and 2019 were evaluated. The demographic characteristics, physical examination findings, co-morbidities, radiologic assesments, operation notes, the time of arrival to the hospital and the operation time of patients who needed immediate surgical intervention were analyzed from the data system of the hospital. The patients were classified as group 1 for the ones with radiologic assesment before the operation and group 2 for the ones whose decision of operation was taken after physical examination only.
Results: The risk evaluation of patients operated for incarceration or strangulation revealed the observation that in comparison with elective surgery, women (elective 9%, emergent 31%) and femoral hernias (elective 1.3%, emergent 21.4%) are much more in emergent surgery group. The diagnosis of patients was based on physical examination findings and radiologic methods were applied for 85.7% of the patients preoperatively. Radiologic assessments prolonged the time for operation and increased the morbidity and intestinal resection. For the evaluation of hernia sac, hernioscopy at %7 of patients and groin exploration from the incision at 93% of patients provided us the appropriate diagnosis.
Conclusions: For emergent hernia surgery, the operation should be performed immediately after physical examination without considering strangulation or incarceration. Apart from suspicious conditions such as obesity and recurrent cases, using radiologic methods for diagnosis may lead to delays and cause morbidities and mortalities. In case of spontaneous reduction; incisional exploration, hernioscopy, laparoscopy or laparotomy should be performed if there is any suspicion on intestinal viability.

Keywords: hernia, femoral hernia, inguinal hernia

Introduction
Groin hernias are very common and surgery is frequently performed [1]. Urgent intervention is required for 5-13% of the groin hernias [1, 3]. In these cases, the risk factors leading to incarceration or strangulation, diagnostic methods, and surgery timing are controversial [4]. The presence of incarceration or strangulation that requires urgent intervention is more common in women, femoral hernias, and patients hospitalized with complaints of hernias in the past 12 months [5, 10]. The groin hernia surgery is a low-risk operation but in emergencies with strangulation or incarceration, the risks increase; morbidity and occasional mortality can be seen. Patient-related factors that increase morbidity and mortality are anticoagulant drug use, patients over 65 years old, female patients, presence of intestinal obstruction, ASA III and IV patients, and body mass index greater than 30 [5, 7, 8, 10, 11]. According to the hernia status, the cases where morbidity and mortality increase generally occurs by the presence of a long-term hernia, delay in treatment and diagnosis of hernia, incarceration longer than 24 hours, symptoms longer than 3 days, the long interval between diagnosis and surgery, femoral hernia, history of an exploration with midline incision after hernia reduction and presence of a recurrent hernia [6, 7, 9, 11, 13]. In this study, we've investigated strangulation or incarceration risk factors, hernia diagnostic methods, time of surgery and surgical treatment methods for the patients we performed emergent groin hernia surgery.

Materials and Methods
After obtaining permission from the hospital ethics committee with the certificate number 2018/0139, inguinal hernias operated between 2017-2019 were examined in this retrospective study. Demographic characteristics, physical examination findings, co-morbidity of the patients were examined through patient files for the patients required urgent surgery. The imaging methods and operation notes, hospital admission time and operation time were examined from the hospital data system. The patients were classified according to their hernia types. Patients who underwent preoperative imaging were group 1, and patients who were decided to operate only after physical examination were group 2. The datas were analyzed with SPSS Statistics Version 26 using student t-test. $P<0.05$ was considered statistically significant.

Results
It's seen that 1655 groin hernia surgery were performed within three years. Of the 1615 patients who underwent undergoing elective surgery, 1470 were male and 143 were female. 85 of the

patients had surgery due to recurrent hernia and 25 had femoral hernia (P <0.01). Of the 42 patients who had emergent surgery due to strangulation or incarceration, 29 were male and 13 were female. 9 femoral and 7 recurrent inguinal hernias were strangulated or incarcerated (Table 1). All the patients underwent emergent surgery were diagnosed pre-operatively with a physical examination, furthermore 26 of the patients were assessed using Ultrasonography (US) and 10 of the patients were analyzed using Computerized Tomography (CT) scan (Photo 1). 6 patients were operated following a physical examination without using any imaging method. The average time between hospital admission and operation was 10.4 hours in group 1 and 6.6 hours in group 2 (p>0.05). Intestinal resection was performed in 8 patients due to strangulation. 7 of these patients were in group 1 and one /1 was in group 2. The mean time between hospital admission and operation time of group 1 patients with intestinal resection was 16 hours and it was 5 hours in group 2. In the ASA risk assessment of the patients, 28 patients were ASA I, 12 patients were ASA II, and 2 patients were ASA III. As for explorations for intestinal viability, 39 patients underwent open exploration through incision, and 3 patients underwent hernioscopy. According to the type of operation, mesh repair was performed in 35 patients, and suture repair was performed in 7 patients.

Discussion

When the incarceration or strangulation cases were examined in terms of risk according to gender and hernia types, it was seen that 69% of the patients were male and 31% were female. However, when elective cases were analyzed, the male ratio was 91% and the female ratio was 9%. The risk of strangulation and incarceration was more common in women [8, 14, 15]. Also, in our study, strangulation and incarceration were observed more frequently in women than patients who had undergone elective surgery.

The risk of strangulation is more common in femoral hernias [8, 11]. Although 1.3% of the patients who underwent elective hernia surgery were femoral, 21.4% of the patients who had undergone emergent hernia surgery had femoral hernia. In our series, it was observed that the risk of emergency strangulation and incarceration was statistically more common in femoral hernias than patients who underwent elective hernia surgery.

Physical examination is sufficient for the diagnosis of emergent inguinal hernia and should be done to every patient [4]. Diagnosing a hernia with physical examination reduces the time to surgery, but also the need for imaging methods [16]. In our study; hernias were diagnosed in all patients by physical examination.

While providing valuable information in appropriate cases in the diagnosis of the incarcerated organ and in assessing viability; the US helps diagnosis especially in obese patients and recurrent cases [17, 18]. Also, it is useful in differential diagnosis in groin related pathologies such as abscesses, painful lymphadenopathy, and hydrocele. The easiness of the application and accessibility of the US, also being a non-invasive method and having cheap cost increase its use in selected cases. We performed preoperative USG examination in 62% of cases in addition to the physical examination.

Although there are clinics performing CT in patients with obstruction [19]; it is not routinely recommended for incarcerated and strangulated groin hernias [4]. In our study, we used CT to investigate other intraabdominal pathologies in 23% of patients.

Incarceration or strangulation time longer than 24 hours increases the chance of intestinal resection [12]. Most of the studies on this subject have been made by accepting the 24-hour incarceration period as a cut off value [3, 20, 21]. In our series, this period was longer than 24 hours in patients who underwent intestinal resection. Incarceration or strangulation time longer than 24 hours resulted in intestinal resection in 19% of patients.

Extending the time between hernia diagnosis and surgery is one of the factors that increase morbidity and mortality [6]. In our study, when we look at the mean time from hospital admission to surgery; it is seen that the duration is longer in group 1 whom were analyzed with compared to the unanalyzed group 2. However, this finding is not statistically significant. In Group 1, we observed that the imaging tests extended the time to surgery and the morbidity increased accordingly.

Increased incarceration and strangulation time are among the reasons that increase the risk of intestinal resection [22, 23]. As a result of further examination of patients who underwent intestinal resection, the mean time from hospital admission to surgery was longer in Group 1 patients than in Group 2. In Group 1, it was observed that the imaging tests increased the time to surgery and this increased the probability of intestinal resection.

In groin hernias with incarceration or strangulation, if there is suspicion about intestinal viability in cases of spontaneous reduction, exploration should be performed [4]. Depending on the type of surgery and experience; open exploration from the groin, hernia sac laparoscopy (hernioscopy), standard laparoscopy or laparotomy can be performed [4, 24]. We performed hernioscopy in 7% of the patients and open exploration from the groin in the remaining 93%. In patients whom open exploration from the groin were not sufficient, hernioscopy allowed us a safe diagnosis.

In emergent cases, surgery should be performed without wasting time, regardless of whether it is incarcerated or strangulated. In emergent hernia surgery, mesh repair is the most appropriate option in clean and clean-contaminated surgical procedures [25, 27]. Although suture repairs come to the fore in infected and contaminated cases, mesh repairs can be applied in cases where the surgical site is well cleaned and protected by dressings, taking into account the risk of infection. However, it should be considered that the risk of infection will be high in these cases, and the profit-loss relationship should be considered well [28, 29]. In our series, 71.4% of the total patients were clean and clean-contaminated cases, and mesh was used in all of them. In the remaining 28.6% contaminated and infected cases, we preferred suture repair in 16.6% and mesh repair in 12%.

Limitations

The limitation of this study is that although the number of elective cases was high, the number of patients with strangulation and incarceration was low. Moreover, since this study was conducted retrospectively, the time between patients' arrival time and the time of imaging was not calculated. Instead, the time between patients' arrival to the hospital and the time to start surgery was evaluated.

Conclusion

Delays in emergency treatment of incarcerated or strangulated groin hernias may lead to morbidity and mortality. In these patients, emergent surgical intervention should be applied following physical examination without making any distinction between strangulation and incarceration. Imaging methods should be used for diagnosis in cases such as obesity and recurrence of hernia. In emergent hernia surgery, mesh repair should be performed in clean and clean-contaminated cases. In contaminated and infected cases, suture repair is recommended, and mesh repairs can be made by considering the risk of infection and by calculating the profit-loss relationship well. If there are doubts about intestinal viability after spontaneous reduction of hernia, exploration should be done.

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